

***FlyBy Math™* Alignment to
Utah Mathematics– Pre-Algebra [2002]
Process Standards, Core Standards and Objectives**

Process Standards

Problem Solving

Process Standard

5. Utilize different problem solving strategies including:
- Drawing a picture or diagram.
 - Looking for a pattern.
 - Identifying counterexamples.
 - Choosing an appropriate operation.
 - Guessing and checking.
 - Making a list, table, graph, or equation.
 - Working backwards.
 - Eliminating possibilities.
 - Making a model or simulation.
 - Solving a simpler or related problem.
 - Checking the reasonableness of results.
 - Using proportional reasoning.

FlyBy Math™ Activities

- Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
- Conduct simulation and measurement for several aircraft conflict problems.
- Use tables, graphs, and equations to solve aircraft conflict problems.

8. Estimate solutions to problems and determine the reasonableness of answers by relating them to the estimates.

- Predict outcomes and explain results of mathematical models and experiments.

Reasoning and Proof

Process Standard

2. Explain and justify problem-solving procedures.

FlyBy Math™ Activities

- Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

3. Examine patterns and note regularities and irregularities in various types of problems.

- Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

Communication

Process Standard

1. Express mathematical ideas coherently and clearly to peers, teachers, and others.

FlyBy Math™ Activities

- Predict outcomes and explain results of mathematical models and experiments.

Connections

Process Standard

1. Formulate real-world situations that require extended investigations, solve them, and justify answers.

FlyBy Math™ Activities

- Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

2. Establish connections among mathematical expressions, physical models, pictorial representations, and real-world situations.	--Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation. --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
5. Recognize and apply mathematical ideas and relationships in areas outside the mathematics classroom, e.g., art, science, other curricular areas, and everyday life.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

Representation

Process Standard	<i>FlyBy Math™</i> Activities
2. Represent mathematical concepts using physical models, visualizations, and appropriate symbolic notations.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. --Conduct simulation and measurement for several aircraft conflict problems.
3. Represent problem situations verbally, numerically, graphically, geometrically, or algebraically.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

Standard 1

Students will acquire number sense and perform operations with rational numbers.

Objective 1

Compute fluently and make reasonable estimates.

Objective	<i>FlyBy Math™</i> Activities
3. Check the reasonableness of results using estimation.	--Predict outcomes and explain results of mathematical models and experiments.

Standard 2

Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols.

Objective 1

Use patterns, relations, and functions to represent mathematical situations.

Objective	<i>FlyBy Math™</i> Activities
1. Represent a variety of relations and functions using tables, graphs, manipulatives, verbal rules, or algebraic rules.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

Objective 2

Represent, solve, and analyze mathematical situations and properties using algebraic symbols.

Objective 3. Determine the slope of a linear relation from a graph or ordered pairs.	<i>FlyBy Math™</i> Activities --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system. --Interpret the slope of a line in the context of a distance-rate-time problem.
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Objective 3

Represent quantitative relationships using mathematical models and symbols.

Objective 1. Create a table, graph, or algebraic expression to represent the relationship between two variables.	<i>FlyBy Math™</i> Activities --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
2. Graph ordered pairs of rational numbers on a rectangular coordinate system.	--Plot points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system to describe the motion of two airplanes.
4. Model real-world problems using various representations, such as graphs, tables, equations, manipulatives, and pictures.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system

Standard 4

Students will understand and apply measurement tools, formulas, and techniques.

Objective 2

Determine measurements using appropriate techniques, tools, and formulas.

Objective 1. Determine an approximate distance between two points using map scales.	<i>FlyBy Math™</i> Activities --Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.
3. Solve problems involving rates and derived measures, e.g., miles per hour, kilometers per liter, cubic feet.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.

Standard 5

Students will draw conclusions using concepts of probability after collecting, organizing, and analyzing a data set.

Objective 1

Formulate and answer questions by collecting, organizing, and analyzing data.

Objective	<i>FlyBy Math™</i> Activities
1. Conduct a survey or experiment to collect data.	--Conduct simulation and measurement for several aircraft conflict problems.
2. Organize and display data using graphical representations such as line plots, bar graphs, stem-and-leaf plots, histograms, scatter plots, circle graphs, box plots (box-and-whisker plots), and pictographs.	--Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs.
3. Make conjectures from a graphical representation.	--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
8. Make predictions and describe the limitations of the predictions when using data samples.	--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. --Compare predictions, calculations, and experimental evidence for several aircraft conflict problems.